



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/579,576

05/25/2000

Ho-Jin Kweon

003364.P048

7384

7590 01/06/2009
Blakely Sokoloff Taylor & Zafman LLP
12400 Wilshire Boulevard 7th Floor
Los Angeles, CA 90025-1026

EXAMINER

WILLS, MONIQUE M

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

01/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/579,576

Applicant(s)

KWEON ET AL.

Examiner

Monique M. Wills

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 5 and 8-38 is/are pending in the application.
- 4a) Of the above claim(s) 1, 8 and 10-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5, 9 and 29-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the Amendment filed October 14, 2008. The rejection of claims 5, 9 & 29-35 under 35 USC 112, first paragraph is overcome. The rejections are maintained as follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 29, 30, 33 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208, in view of Mayer U.S. Pat. 6,379,842.

With respect to claim 5, Miyasaka teaches: a physical mixture of a lithiated transition metal compound (col. 11, lines 10-20); a powder metal including *aluminum* (col. 8, lines 10-15); a carbon black conductive agent (col. 8, lines 5-10); a binder (col. 8, lines 30-45); an organic electrolyte solution (col. 8, lines 48-53); the active material includes LiCoO_2 , embracing formula 7, when B is Co and A is O (col. 5, lines 15-25);

and the metal additive is 2 to 15 wt % of the active material (col. 8, lines 15-20). The electrode material is coated on the current collector prior heat treatment. See col. 10, lines 15-20. With respect to claims 29 & 30, the active material includes LiCoO_2 embracing LiBA_2 and $\text{LiBO}_{2-z}\text{A}_z$ when B is Co and A is O (col. 8, lines 15-25). With respect to claims 33 & 34, the active material is LiCoNiO_2 , embracing LiNiCoA_2 and $\text{LiNiCoO}_{2-z}\text{A}_z$ when A is oxygen (col. 8, lines 15-25).

Miyasaka is silent to an electrode additive of at least one of Si, B, Ti, Ga, Ge, Ca, Mg, Sr and Ba (claim 5). The reference does not expressly disclose heat treating the positive active material to uniform crystalline form (claim 5). The reference does not disclose coating the active material after heating.

However, Meyer teaches the employment of magnesium in lithium oxide electrode materials in the amount of 5%. See the Abstract..

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the magnesium additive of Meyer, in the positive electrode of Miyasaka, in order to improve thermal stability and/or increase capacity of the electrode material.

With respect to coating the electrode material after heating, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to coat the electrode after heating, since selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); In re Gibson, 39 F.2d 975, 5 USPQ 230 (CCPA 1930).

With respect to heat treating the cathode material to uniform crystalline form, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to heat treat the material of Miyasaka to uniform crystalline form, to facilitate intercalation and de-intercalation of lithium ions from the electrode material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 29, 30, 33 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saidi et al., U.S. Patent 5, 851,696 in view of Mayer U.S. Pat. 6,379,842.

Saidi teaches a rechargeable lithium battery (abstract). With respect to claim 5, Saidi teaches a slurry composition comprising: a physical mixture of a positive active material including $LiMnO_4$, $LiCoO_2$, $LiNiO_2$, $LiNiVO_4$, $LiCoVO_4$, $LiCoNiO_2$ or $LiTmO_2$ where Tm is a transition metal or combination of transition metals (col. 6, lines 10-20); a binder (col. 9, lines 10-15); a carbon conductive agent (col. 9, lines 15-20); and an organic solvent (col. 9, lines 65-68); coated onto a current collector and dried (col. 9, lines 15-21 & 60-68); and the positive active material includes $LiCoO_2$

(instant formula 3), LiNiO_2 (instant formula 3) or LiCoNiO_2 (instant formula 11). See column 6, lines 10-20. With respect to claim 29, the active material is LiCoO_2 embracing the formula Li_xBA_2 when $x=1$ and A is oxygen (col. 6, lines 10-20). With respect to claim 30, the active material is LiCoO_2 embracing the formula $\text{Li}_x\text{BO}_{2-z}\text{A}_z$ when $x=1$ and A is oxygen (col. 6, lines 10-20). With respect to claim 33, the active material is LiCoNiO_2 , embracing the formula $\text{Li}_x\text{NiCoA}_2$ when $x=1$ and A is oxygen (col. 6, lines 10-20). With respect to claim 34, the active material is LiCoNiO_2 , embracing the formula $\text{Li}_x\text{NiCoO}_{2-z}\text{A}_z$ when $x=1$ and A is oxygen (col. 6, lines 10-20).

Saidi is silent to an electrode additive of at least one of Si, B, Ti, Ga, Ge, Ca, Mg, Sr and Ba, in an amount of 0.01 to 10wt% (claim 5). The reference is also silent to coating the electrode composition after heating (claim 5) to form a positive active material of uniform crystalline form (claim 5).

However, Meyer teaches the employment of silicon in lithium oxide electrode materials in the amount of 5%. See the Abstract.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the silicon additive of Meyer, in the positive electrode of Saidi, in order to improve thermal stability and/or increase capacity of the electrode material.

With respect to heat treating the cathodic material, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to heat the positive electrode material of Saidi, in order to remove impurities from the

electrode particles. With respect to coating the electrode material after heating, the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930).

With respect to heat treating the cathode material to uniform crystalline form, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to heat treat the material of Saidi to uniform crystalline form, to facilitate intercalation and de-intercalation of lithium ions from the electrode material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saidi et al., U.S. Patent 5, 851,696 in view of Mayer U.S. Pat. 6,379,842 and further in view of Matsubara U.S. Pub. 2001/0010807.

Saidi in view of Meyer teach an active slurry composition as described hereinabove. Saidi teaches a positive active material comprising LiTmO_2 , where Tm is a combination of transition metals (col. 6, lines 15-20).

Saidi does not expressly disclose a lithium nickel/cobalt material of the formula $\text{Li}_x\text{Ni}_{1-y-z}\text{Co}_y\text{M}^n\text{A}_2$.

However, Matsubara teaches that it is conventional to employ lithium nickel/cobalt oxides of the formula $\text{Li}_y\text{Ni}_{1-x}\text{Co}_x\text{M}_{x2}\text{O}_2$ where M is Al, Fe, Mn where y is $0.9 < y < 1.3$ and $0 < x < 0.5$ (¶¶ 13-14). This compound improves the charging and discharging cycle characteristics of the positive electrode so that it retains high battery capacity (abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the instant compound, because even though Saidi does not specifically teach $\text{Li}_x\text{Ni}_{1-y-z}\text{Co}_y\text{M}^n\text{A}_2$, Matsubara teaches that material of this formula improves the charging and discharging cycle characteristics and battery capacity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 9, & 29-32 are rejected under 35 U.S.C. 103(a) being unpatentable over Gosho et al. U.S. Patent 6,589,694 and further in view of Mayer U.J.S. Pat. 6,379,842.

Gosho teaches a positive active material comprising LiCoO_2 , LiNiO_2 , $\text{LiCo}_{1-x}\text{Ni}_x\text{O}_2$, wherein $0.1 < x$ and $y < 0.1$ (col. 6, lines 15-23). With respect to claim 5, The active material is prepared by mixing a binder, carbon black and N-methyl-z-pyrrolidone to form a slurry (col. 19, lines 45-55), the slurry is applied onto both surfaces of a current collector and dried (col. 19, lines 45-55), and the positive active material includes LiCoO_2 (instant formula 3), LiNiO_2 (instant formula 3) or LiCoNiO_2 (instant formula 11). See column 6, lines 15-23. The electrode material is heat treated prior to coating on the current collector. See Examples 1-4. With respect to claim 9, the organic solvent is N-methylpyrrolidone (col. 19, lines 50-55). With respect to claim 29, the active material is LiCoO_2 embracing the formula Li_xBA_2 when $x=1$ and A is oxygen (col. 6, lines 15-23). With respect to claim 30, the active material is LiCoO_2 embracing the formula $\text{Li}_x\text{BO}_{2-z}\text{A}_z$ when $x=1$ and A is oxygen (col. 6, lines 15-23). With respect to claim 31 & 32, the active material is $\text{LiNi}_{1-x}\text{Al}_x\text{O}_2$, embracing the formula $\text{Li}_x\text{B}_{1-y}\text{M}^n_y\text{A}_z$ when B is Ni, M^n is Al and A is O (col. 6, lines 15-23).

Gosho is silent to an electrode additive of at least one of Si, B, Ti, Ga, Ge, Ca, Mg, Sr and Ba (claim 5) in an amount of 0.01 to 10 wt% (claim 5). The reference does not expressly disclose heat treating the positive active material to uniform crystalline form (claim 5).

However, Meyer teaches the employment of magnesium in lithium oxide electrode materials in the amount of 5% . See the Abstract..

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the magnesium additive of Meyer , in the positive electrode of Gosho, in order to improve thermal stability and/or increase capacity of the electrode material.

With respect to heat treating the cathode material to uniform crystalline form, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to heat treat the material of Gosho to uniform crystalline form, to facilitate intercalation and de-intercalation of lithium ions from the electrode material.

Response to Arguments

Applicant has amended the claims essentially identical to the claims set forth in the response filed February 13, 2008. The claims set forth 6.25/08 included new matter that, if support was provided would overcome the rejections of record. Specifically, the combination of an *oxide* AND an additive of Si, B, Ge, Ga, Ca, Sr and Ba distinguishes from the rejections of record. See the Arguments set forth in the Office Action of August 6, 2008:

Applicant's arguments with respect to Miyasaka, Mayer, Saidim Matsubara and Gosho being silent to the oxide additive to be mixed with an element of Si, B, Ga, Ge, Ca, Sr and Ba, is correct. However, the specification does not appear to support the

combination of the oxide an element, including any one of Si, B, Ga, Ge, Ca, Sr and Ba. An appropriate correction is required. Once adequate support is provided for the newly added limitations, the above mentioned rejections will be withdrawn.

The claims as current amended do not require a mixture of an oxide of the elements AND any one of Si, B, Ga, Ge, Ca, Sr and Ba. The claims allow for the alternative of an oxide OR Si, B, Ga, Ge, Ca, Sr and Ba which the rejections of record satisfy. When Applicant amends the claims require an oxide mixture AND provides support, the rejections will be withdrawn. As a courtesy to Applicant, the rejections have been made non-final in the event that communications in the interview summary of October 8, 2008 was unclear.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Patrick Ryan, may be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Monique M Wills/

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795

Application Number

Application/Control No.

09/579,576

Examiner

Monique M. Wills

Applicant(s)/Patent under
Reexamination

KWEON ET AL.

Art Unit

1795